UNITED STATES PATENT AND TRADEMARK OFFICE

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 June 2008*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-40* is/are pending in the application.

     4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

     a)☐ All   b)☐ Some * c)☐ None of:

         1.☐ Certified copies of the priority documents have been received.

         2.☐ Certified copies of the priority documents have been received in Application No. _____.

         3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

     * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
     Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
     Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

1.   Claims 1-40 are pending.

Claim Objections

2.   Claim 4 is objected to because of the following informalities: claim 4 is not dependent

on any preceding claim and raises antecedent basis issue. Appropriate correction is required.

Claim Rejections - 35 USC § 112

3.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the
> subject matter which the applicant regards as his invention.

4.   Claims 1-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for

failing to particularly point out and distinctly claim the subject matter which applicant regards as

the invention.

      a.   The following terms lack antecedent basis in the claims:

          i.   Claim 6, line 3 -- "the virtual machine" --

          ii.   Claim 6, line 5 -- "the virtual machine" --

      a.   The following language are not clearly understood:

          i.   Claim 1, line 3 recites " a first virtual machine" its not clear if there are

multiple virtual machine in the system or just one virtual machine.

Claim Rejections - 35 USC § 102

5.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6.   Claims 1, 2, 4-40 are rejected under 35 U.S.C. 102(b) as being anticipated by Mori et

al.(Mori) US Patent Application Publication No. 2002/0013802.

7.   As per claim 1, Mori teaches the invention as claimed including a method comprising:

        evaluating the usage by a first virtual machine of each of plurality of physical resources,

including at least one of an input device, a display device, and a communication device, to which

access is controlled by a virtual machine monitor (par. 0017; par. 0004; par. 0028; par. 0036);

and

        reallocating only a subset(memory) of the plurality of physical resources to the first

virtual machine based, at least in part, on the evaluated usage (par. 0028, lines 4-7; par. 0049;

par. 0051; par. 0052; figure 4).

8.   As per claim 2, Mori teaches monitoring the usage by a second virtual machine of at least

one of the plurality of physical resources (par. 0007; par. 0009; par 0035, lines 1-11).

9.   As per claim 4, Mori teaches monitoring the usage includes: monitoring the usage

substantially in parallel with executing the virtual machine (par. 0034; par 0035, lines 1-11).

10.   As per claim 5, Mori teaches reallocating only a subset of the plurality of physical resources to the virtual machine based, at least in part, on the evaluated usage includes: either increasing or decreasing the ability of the first virtual machine to access one of the plurality of physical resources (par. 0016; par. 0048; figure 4).

11.   As per claim 6, Mori teaches reallocating only a subset of the plurality of physical resources to the first virtual machine includes(par. 0028, lines 4-7; par. 0049; par. 0051; par. 0052; figure 4): increasing the ability of the virtual machine to access a first physical resource(par. 0016); and

decreasing the ability of the virtual machine to access a second physical resource (par. 0016).

12.   As per claim 7, Mori teaches reallocating only a subset of the plurality of physical resources to the first virtual machine includes a reallocation selected from a group including the following: altering the order in which the first virtual machine and the second virtual machine are executed, swapping between the first and second virtual machine, assigning core affinity to one of the first virtual machine and the second virtual machine, assigning a processor affinity to one of the first virtual machine and the second virtual machine, and altering the time quanta assigned to at least one of the first virtual machine and the second virtual machine (par. 0018; par. 0029; par. 0030; figure 4).

13.   As per claim 8, Mori teaches reallocating only a subset of the plurality of the physical

resources to the first virtual machine is performed by the virtual machine monitor having a

resource manager to evaluate the first virtual machine activity (par. 0036).

14.   As per claim 9, Mori teaches the resource manager is a part of an integrated circuit(par.

0036).

15.   As per claim 10, Mori teaches evaluating the usage includes:

        determining whether the activity of the first virtual machine is sufficient to trigger a

change in the resource allocation (par. 0010; par. 0028);

        suggesting a resource allocation (par. 0052); and

        determining whether the suggested resource allocation negatively impacts the

performance of another virtual machine (par.0056).

16.   As per claim 11, Mori teaches the invention as claimed including an article comprising:

        a storage medium having a plurality of machine accessible instructions, wherein when the

instructions are executed, the instructions provide for(par. 0034, lines 1-4):

        evaluating the activity of one or more virtual machines, the activity including usage of

one or more physical resources, including at least one of an input device, a display device, and a

communication device, to which access is controlled by a virtual machine monitor (par. 0017;

par. 0004); and

        reallocating physical resources to the virtual machine(s) based, at least in part, on the

evaluated activity (par. 0028, lines 4-7).

17.   As per claim 12, Mori teaches monitoring the activity of one or more virtual machines

(par. 0007; par. 0009).

18.   As per claim 13, Mori teaches monitoring the activity of one or more virtual machines

includes monitoring an activity selected from a group including: interrupt usage, processor

usage, network usage, disk usage, and whether the virtual machine is performing a time-critical

task (par. 0030).

19.   As per claim 14, Mori teaches monitoring the activity of one or more virtual machines

includes: monitoring the activity of the virtual machine substantially in parallel with executing

the virtual machine (par. 0034).

20.   As per claim 15, Mori teaches reallocating physical resources to the virtual machine(s)

based, at least in part, on the evaluated activity includes: either increasing or decreasing the

ability of the virtual machine(s) to access to a physical resource (par. 0016).

21.   As per claim 16, Mori teaches reallocating physical resources to the virtual machine(s)

includes: increasing the ability of the virtual machine(s) to access to a first physical resource(par.

0016); and

        decreasing the ability of the virtual machine(s) to access to a second physical resource

(par. 0016).

22.   As per claim 17, Mori teaches reallocating physical resources to the virtual machine(s)

includes a reallocation selected from a group including the following: altering the order in which

the virtual machine(s) are executed, swapping between virtual machines, assigning core affinity

to a virtual machine, assigning a processor affinity to a virtual machine, and altering the time

quanta assigned to the virtual machine(s) (par. 0018).

23.   As per claim 18, Mori teaches reallocating physical resources to the virtual machine(s) is

performed by the virtual machine monitor having a resource manager to evaluate the virtual

machine(s) activity (par. 0036).

24.   As per claim 19, Mori teaches the resource manager is a part of an integrated circuit(par.

0036).

25.   As per claim 20, Mori teaches evaluating the activity of one or more virtual machines

includes:

        determining whether the activity of the virtual machine(s) is sufficient to trigger a change

in the resource allocation (par. 0010);

        suggesting a resource allocation (par. 0052); and

        determining whether the suggested resource allocation negatively impacts the

performance of another virtual machine (par.0056).

26.   As per claim 21, Mori teaches the invention as claimed including an apparatus

comprising:

a plurality of physical resources, including at least one of an input device, a display

device, and a communication device (par. 0004);

a plurality of virtual machines, capable of sharing the plurality of physical resources (par.

0030);

an activity monitor, capable of monitoring the activity of the virtual machines, the

activity including usage of the plurality of physical resources (par. 0004; par. 0017);

a virtual machine manager, capable of managing the virtual machines and reallocating

access to the physical resources amongst the virtual machines, based at least in part on the

monitored activity (par. 0047; par. 0048; par. 0028, lines 4-7).

27.   As per claim 22, Mori teaches the virtual machine monitor includes a resource manager

that is capable of reallocating access to the physical resources amongst the virtual machines (par.

0036).

28.   As per claim 23, Mori teaches the activity monitor is capable of monitoring an activity

selected from a group including: interrupt usage, processor usage, network usage, disk usage,

and whether the virtual machine is performing a time-critical task (par. 0030).

29.   As per claim 24, Mori teaches the activity monitor is capable of monitoring the activity of

the virtual machines substantially in parallel with the execution the virtual machines (par. 0034).

30.   As per claim 25, Mori teaches the virtual machine monitor is capable of either increasing

or decreasing the ability of the virtual machine(s) to access to a physical resource (par. 0016).

31.   As per claim 26, Mori teaches virtual machine monitor is capable of reallocating physical

resources to the virtual machine(s) via: increasing the ability of the virtual machine(s) to access

to a first physical resource (par. 0016); and

        decreasing the ability of the virtual machine(s) to access to a second physical resource

(par. 0016).

32.   As per claim 27, Mori teaches virtual machine monitor is capable of reallocating physical

resources to the virtual machine(s) by selecting from a group including the following: altering

the order in which the virtual machine(s) are executed, swapping between virtual machines,

assigning core affinity to a virtual machine, assigning a processor affinity to a virtual machine,

and altering the time quanta assigned to the virtual machine(s) (par. 0018).

33.   As per claim 28, Mori teaches the resource manager is further capable of evaluating the

monitored activity of the virtual machine(s) (par. 0017).

34.   As per claim 29, Mori teaches the resource manager is capable of evaluating the

monitored activity of the virtual machine by (par. 0030):

determining whether the activity of the virtual machine(s) is sufficient to trigger a change

in the resource allocation (par. 0010);

suggesting a resource allocation (abstract, lines 13-14); and

determining whether the suggested resource allocation negatively impacts the

performance of another virtual machine (par. 0034).

35.   As per claim 30, Mori teaches the activity monitor and virtual machine monitor are

integrated into the same circuit (par. 0036).

36.   As per claims 31-40, they have similar limitations as of claims 21-30 above. Therefore,

they are rejected under the same rational as of claims 21-30 above.

Claim Rejections - 35 USC § 103

37.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

38.   Claim 3 rejected under 35 U.S.C. 103(a) as being unpatentable over Mori et al.(Mori) US

Patent Application Publication No. 2002/0013802, in view of Waldspurger(Waldspurger) US

Patent No. 7412492.

39.   As to claim 3, Mori does not specifically disclose monitoring the usage includes monitoring the mapping of the virtual resource to a physical resource (figure 4; par. 0056; par. 0057).

        However, Waldspurger teaches monitoring the usage includes monitoring the mapping of the virtual resource to a physical resource (col 5, lines 6-16).

40.   It would have been obvious to a person of ordinary skill in art at the time of invention was made to incorporate the teaching of Waldspurger into the method of Mori to monitor the mapping of the virtual resource to the hardware resource. The modification would have been obvious because one of the ordinary skills of the art would monitor the resource mapping to be able to more precisely know the resource that needs to be allocated from the physical resource.

Response to Arguments

41.   Applicant's arguments filed 06/18/2008 have been fully considered but they are not persuasive.

42.   In remarks applicant argues that:

        (1) Mori fails to teach reallocating only a subset of a plurality of physical resources to a virtual machine based on evaluated usage according to claim 1.

        (2) Mori fails to teach reallocating physical resource to a virtual machine based on evaluated usage of the physical resources by the virtual machine as to claims 11, 21 and 31.

43.   Examiner respectfully disagree with applicant:

i.   as to point (1), applicant supports his argument mentioning that Mori fails to teach

reallocating only a subset of a plurality of physical resources to a virtual machine based

on evaluated usage. Examiner respectfully disagrees with the applicant. Mori teaches

evaluating physical resources and allocating a subset of physical resources based on the

evaluation(par. 0028, lines 4-7; par. 0049; par. 0051; par. 0052; figure 4). The active

OS(first virtual machine) evaluates the available memory allocation to determine if

enough resources are available to execute the applications executing on the VM and if

determined there is not enough memory available the active OS will request for more

memory from the VMM. The VMM will response to the request by extending the

memory allocated to the active OS reallocating from the unused memory space or from

its own memory allocation (figure 4).

ii.   as to point (2), applicant supports his argument mentioning that Mori teaches

reallocating resources of an active operating system to a standby operating system where

the claim requires "reallocating physical resources to virtual machines based on

evaluating the usage of the physical resources by the virtual machines". Examiner

respectfully disagrees with the applicant. The claimed limitations of claims 11, 21 and 31

does not recite **evaluating usage of the physical resources** instead claim recites

evaluating activity which is different than evaluating physical resources usage. In order

for the examiner to consider the limitation applicant is suggested to amend the claim to recite the similar limitations of claim 1 which evaluates the resource usage.

Conclusion

44.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to ABDULLAH AL KAWSAR whose telephone number is (571)270-3169. The examiner can normally be reached on 7:30am to 5:00pm, EST.

45.   If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng Ai T. An can be reached on 571-272-3756. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

46.   Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Meng-Ai An/   /Abdullah-Al Kawsar/
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